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ABSTRACT

This document presents the application and use of mathematics learning proposed by the Arkansas curriculum frameworks for grades 5-8. The standards are presented in chart form and organized into five strands: (1) number sense, properties, and operations; (2) geometry and spatial sense; (3) measurement; (4) data analysis, statistics, and probability; and (5) patterns, algebra, and functions. Student learning expectations for each of the content standards are also provided. (KHR)

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Sample Grade Level Benchmarks

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Grades 5-8

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based on the 1998 Arkansas State Mathematics Framework
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STRAND: **1 NUMBER SENSE, PROPERTIES, AND OPERATIONS**

CONTENT STANDARD ___1. **The student will communicate an understanding of the properties of numbers and operations (add, subtract, multiply, divide).**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _1_ **Identify numerical patterns (e.g., prime numbers, squares, exponents) and verify results (e.g., by continuing the pattern).**	**The student will identify numerical patterns with one variable such as square numbers (e.g. find the next three numbers in this pattern: 9, 16,25, __, __, __) and will develop the concepts of integers through the use of coordinate planes.**	**The student will identify numerical patterns with one variable such as exponential numbers (e.g., find the next three numbers in this pattern: 4, 16, 64, __, __, __) and prime numbers (e.g. find the next three numbers in this pattern: 13, 17, 19, __, __, __) and will identify numerical patterns with two variables such as row by column in a rectangular grid and will verify results (e.g., continuing the pattern).**	**The student will identify numerical patterns with one variable such as cubic numbers (e.g., find the next three numbers in this pattern: 1, 8, 27, 64, __, __, __) and positive and negative integers.**	**The student wil identify and extend arithmetic (when the difference between the terms is constant) (e.g. 3, 6, 9, 12, ...) and geometric (when the ratio between the terms is constant) (e.g., 1, 3, 9, 27, 81, ...) sequences; represent an arithmetic and geometric sequence algebraically.**

THIS DOCUMENT ADDRESSES THE APPLICATION AND USE OF LEARNING PROPOSED BY THE ARKANSAS CURRICULUM FRAMEWORKS

STRAND: 1 NUMBER SENSE, PROPERTIES, AND OPERATIONS

CONTENT STANDARD ___1. **The student will communicate an understanding of the properties of numbers and operations (add, subtract, multiply, divide).**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _2_ **Expand number sense through the use of mental computation, calculators/technology, and written and verbal communication (e.g., powers of ten, factoring, greatest common factors, least common multiples).**	**The student will expand number sense by: understanding and using compatible numbers (e.g., 6 and 4 are 10 therefore 36 + 14 = 50 is computed mentally); rounding to the nearest tenth in a decimal based on the context of the problem; recognizing fractions equivalent to common fractions (e.g., 5/15 = 1/3); finding the multiples of a number; using estimation techniques to estimate sums and differences of decimals; solving word problems using calculators/technology as learning tools (e.g., explore patterns of fractions using calculators with fraction capabilities such as a scientific calculators); oral and/or written communication of reasoning for results of computations; use a scoring guide to perform self-evaluation.**	**The student will expand number sense by: mentally multiply by powers of ten up to 10^3; using the front-end estimation technique (e.g., 132 + 45 is approximately equal to 100 + 40 = 140, therefore, the answer will be greater than 140); using expanded notation as a mental computation technique; rounding to the nearest thousandth in a decimal based on the context of the problem; finding the factors of a number; finding the greatest common factor (GCF) and the least common multiple (LCM); recognizing fractions equivalent to common decimals and percents (e.g., 1/4 = .25 = 25% or 0.5 = ½ = 50%); solving word problems using calculators/technology as learning tools; oral and/or written communication of reasoning for results of computations; use a scoring guide to perform self-evaluation.**	**The student will expand number sense by: mentally multiplying and dividing by powers of ten up to 10^4; using compatible numbers for estimating quotients (e.g., 248 63 is approximately equal to 240 60 = 4); rounding to the nearest hundred-thousandth in a decimal based on the context of the problem; mentally estimating the sums and differences of mixed numbers; mentally computing the sum, difference, product, and/or quotient of integers; choosing the appropriate problem solving strategy (including but not limited to estimation, mental computation, paper and pencil, calculators/technology) (e.g., multiply and/or divide large numbers by converting them to scientific notation before completing the designated operation); oral and/or written communication of reasoning of computations; use a scoring guide to perform self-evaluation.**	**The student will expand number sense by: mentally solving simple linear equations (e.g., If 2x + 1 = 7, then x = 3.); mentally computing the cube of the whole numbers 1 through 5; using truncating as a form of estimation (e.g., 132 + 45 = 130 + 40 = 170); solving word problems using calculators/technology as learning tools and organizational tools (e.g., using calculators to make scatter plots and to calculate lines and curves to fit data); oral and/or written communication of reasoning for results of computations; use a scoring guide to perform self-evaluation.**

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STRAND: 1 NUMBER SENSE, PROPERTIES, AND OPERATIONS

CONTENT STANDARD ___1. **The student will communicate an understanding of the properties of numbers and operations (add, subtract, multiply, divide).**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _3_ **Represent numbers and operations in a variety of equivalent forms (including models, tree diagrams, and symbols).**	**The student will: represent operations using models (i.e., arrays with base ten blocks for multiplication and division of whole numbers to illustrate the distributive property of multiplication over addition, etc.); multiply a 3-digit whole number by a 2-digit whole number;divide whole numbers by 2-digit divisors; use manipulatives to represent fractions (i.e., continuous wholes, equivalent fractions, and discrete sets with fraction bars, attribute blocks, fraction strips, etc.) (e.g., ½ of a cake and ½ of a dozen eggs).**	**The student will: find and represent the prime factorization of a number using a variety of forms (i.e., tree diagrams, stair steps, etc.); represent a quantity using mixed numbers and improper fractions; represent any quantity as a fraction, decimal, and/or percent; represent a fraction as division.**	**The student will: represent numbers in exponential notation (e.g., $24 = 2^3 \times 3$); represent a quantity using mixed numbers and decimals; represent multiplication using parentheses and "dot"; represent a multi-digit number using scientific notation (e.g., $43000 = 4.3 \times 10^4$ or $0.0043 = 4.3 \times 10^{-3}$); represent a quantity using various operations (e.g., The quantity 6 can be represented as 2 + 4 or (2)(3) or 12 2 or 12 - 6); compare integers.**	**The student will: convert repeating decimals to equivalent fractions (0.33 with a bar over the last 3 = 1/3) ; represent multiplication using adjacent terms (e.g., 3n or xy).**

THIS DOCUMENT ADDRESSES THE APPLICATION AND USE OF LEARNING PROPOSED BY THE ARKANSAS CURRICULUM FRAMEWORKS

STRAND: 1 NUMBER SENSE, PROPERTIES, AND OPERATIONS

CONTENT STANDARD ___1. **The student will communicate an understanding of the properties of numbers and operations (add, subtract, multiply, divide).**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _4_ **Consistently demonstrate competence with rational number computations (add, subtract, multiply, and divide) with and without manipulatives and technology.**	**The student will: add and subtract fractions and/or mixed numbers with and without like denominators using manipulatives; multiply a whole number by a fraction; divide numbers with a decimal in the dividend (e.g., $4.25 5 = $0.85); use appropriate software technology to demonstrate competence with rational number computations.**	**The student will: divide numbers with a decimal in the divisor and the dividend (e.g., $4.25 $0.50 = 8.5); add and subtract fractions without like denominators; multiply fractions and decimals using manipulatives, pictures, and technology to develop the concepts symbolically; use appropriate technology (i.e., software, calculators with fraction capabilities, etc.) to explore rational number computations.**	**The student will: add, subtract, and multiply decimals, fractions, and mixed numbers; use manipulatives, pictures, and technology to develop the symbolic concepts of addition, subtraction, multiplication, and division of positive and negative integers.**	**The student will: use manipulatives, pictures, symbols and technology to add, subtract, multiply, and divide decimals, integers, fractions, and mixed numbers with and without variables to investigate real-world situations; identify and use rational number properties.**

STRAND: 1 NUMBER SENSE, PROPERTIES, AND OPERATIONS

CONTENT STANDARD ___1. **The student will communicate an understanding of the properties of numbers and operations.**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _5_ **Communicate knowledge of elementary number theory concepts (e.g., primes, factors, multiples, divisibility rules) through classroom interaction and written responses (e.g., tests, journals).**	**Students will communicate knowledge of: place value to the nearest tenth in a decimal; divisibility rules for 2, 5, and 10; multiples through classroom interaction (e.g., performance assessments, response to verbal questions, etc.) and written responses (e.g., response to open-ended questions, journals, etc.); use a scoring guide to perform self-evaluations.**	**Students will communicate knowledge of: place value to the nearest thousandth of a decimal; prime and composite numbers; least common multiple (LCM); greatest common factor (GCF); divisibility rules for 3 and 6; equivalent fractions; comparing and ordering fractions, including mixed numbers; the operations on fractions and decimals through classroom interaction (e.g., performance assessments, response to verbal questions, etc.) and written responses (e.g., response to open-ended questions, journals, etc.); use a scoring guide to perform self-evaluations.**	**Students will communicate knowledge of: divisibility rules for 4 and 9; place value to the nearest hundred thousandth of a decimal; exponents; scientific notation; operations of integers through classroom interaction (e.g., performance assessments, response to verbal questions, etc.) and written responses (e.g., responses to open-ended questions, journals, etc.); use a scoring guide to perform self-evaluations.**	**Students will communicate knowledge of: absolute value of an integer; square roots of perfect squares up to 144; simple linear equations; repeating decimals; operations with decimals, integers, fractions, and mixed numbers through classroom interaction (e.g., performance assessments, response to verbal questions, etc.) and written responses (e.g., responses to open-ended questions, journals, etc.); use a scoring guide to perform self-evaluations.**

THIS DOCUMENT ADDRESSES THE APPLICATION AND USE OF LEARNING PROPOSED BY THE ARKANSAS CURRICULUM FRAMEWORKS

STRAND: 1 **NUMBER SENSE, PROPERTIES, AND OPERATIONS**

CONTENT STANDARD ___1. **The student will communicate an understanding of the properties of numbers and operations.**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _6_ **Identify, with/without the aid of technology, irrational numbers and locate irrational numbers relative to other numbers (e.g., the square root of 2 is between 1 and 2, pi is between 3 and 4).**	**N/A**	**Students will identify, with and without the aid of technology, pi (π) as an irrational number and locate pi relative to other numbers (e.g., pi is a little bit more than the number 3).**	N/A	**Students will identify, with/without technology, irrational numbers and locate irrational numbers relative to other numbers (e.g., the square root of 2 is between 1 and 2).**

THIS DOCUMENT ADDRESSES THE APPLICATION AND USE OF LEARNING PROPOSED BY THE ARKANSAS CURRICULUM FRAMEWORKS

STRAND: 1 NUMBER SENSE, PROPERTIES, AND OPERATIONS

CONTENT STANDARD __2. **The student will demonstrate and apply knowledge of numbers and numerical relationships to real-world situations.**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _1_ **Use estimation to check the reasonableness of computation in application problems.**	**Students will use rounding and other estimation techniques to estimate: sums, differences, products, and quotients of whole numbers and fractions; sums and differences of decimals to check the reasonableness of computation in application problems.**	**Students will use estimation techniques (i.e., front-end estimation, rounding, etc.) to check the reasonableness of computed answers to real-life problems (e.g., the amount of a tip, sales tax on items, total of purchase, discount, money needed to purchase a group of items, etc.).**	**Students will use estimation techniques (i.e., compatible numbers, rounding, etc.) to check the reasonableness of computed answers on consumer-type problems (e.g., computing amount of sales tax, discounts, simple interest, unit price of an item, and percent increase or decrease).**	**Students will use estimation techniques (i.e., rounding, truncating, etc.) to check the reasonableness of the square root of a whole number, the cube of a whole number, and the answers to consumer-type problems (e.g., sales tax, discount, simple interest, etc.).**

STRAND: 1 **NUMBER SENSE, PROPERTIES, AND OPERATIONS**

CONTENT STANDARD ___2. **The student will demonstrate and apply knowledge of numbers and numerical relationships to real-world situations.**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _2_ **Develop strategies for comparing quantities using ratios and proportions (e.g., fractions, rates, unit rates, percents, scales) with use of manipulatives and technology.**	**Students will develop strategies for comparing quantities using ratios and express ratios as fractions in simplest form with the use of manipulatives and technology.**	**Students will write missing terms in proportions, express ratios as fractions in simplest form, and find a unit rate with the use of manipulatives and technology.**	**Students will determine equivalent ratios, change a ratio to a unit rate to determine the lowest price/unit, increase a recipe using proportions, write and solve a proportion to: find the missing length of a side on similar geometric figures and scale drawings; change fractions to percents; to find a percent of a number; to find what percent one number is of another with the use of manipulatives and technology.**	**Students will determine unit rates, determine if a pair of ratios form a proportion and solve proportions, solve problems using proportions, use ratios to solve scale-drawing problems (e.g., maps, blueprints, etc.), apply proportions to percents (e.g., 7/8 = x/100).**

STRAND: 1 NUMBER SENSE, PROPERTIES, AND OPERATIONS

CONTENT STANDARD ___2. The student will demonstrate and apply knowledge of numbers and numerical relationships to real-world situations.	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _3_ **Determine the most appropriate notational representation of a number for the given problem (e.g., fractions vs. decimals, scientific notation).**	**Students will determine the most appropriate notational representation of a number for the given problem (e.g., common fractions vs. common decimals vs. common percents, rounding to significant digit, etc.).**	**Students will determine the most appropriate notational representation of a number for a given problem (e.g., fractions vs. decimals vs. percents, prime factors, expanded notation, rounding to significant digit, etc.).**	**Students will determine the most appropriate notational representation of a number for a given problem (e.g., scientific notation, exponential notation, rounding to significant digit, etc.).**	**Students will determine the most appropriate notational representation of a number for a given problem (e.g., fractions, mixed numbers, decimals, scientific notation, exponents, algebraic, etc.).**
STUDENT LEARNING EXPECTATION _4_ **Explain the relationship of numbers in one- and two-dimensional graphs (e.g., number lines and coordinate graphs), with and without appropriate technology such as graphing calculators.**	**Students will explain the relationship of numbers on number lines with positive numbers and common fractions, coordinate graphs with positive numbers, line graphs, and bar graphs with and without appropriate technology such as graphing calculators.**	**Students will explain the relationship of numbers on number lines (fractions and decimals), coordinate graphs with positive numbers, and double bar graphs with and without appropriate technology such as graphing calculators.**	**Students will explain the relationship of numbers on number lines (integers) and coordinate graphs with positive and negative numbers with and without appropriate technology such as graphing calculators.**	**Students will explain the relationship of numbers on graphs of linear equations with and without appropriate technology such as graphing calculators.**

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STRAND: 1 **NUMBER SENSE, PROPERTIES, AND OPERATIONS**

CONTENT STANDARD __2. **The student will demonstrate and apply knowledge of numbers and numerical relationships to real-world situations.**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _5_ **Communicate using appropriate vocabulary as it relates to the real number system in real-world situations (e.g., integers, whole, rational, irrational, natural/counting, etc.).**	**Students will communicate in written or verbal form using appropriate vocabulary as it relates to the real number system in real-world situations (e.g., whole, natural/counting, etc.); use a scoring guide to perform self-evaluations.**	**Students will communicate in written or verbal form using appropriate vocabulary as it relates to the real number system in real-world situations (e.g., whole, natural/counting, rational, etc.); use a scoring guide to perform self-evaluations.**	**Students will communicate in written or verbal form using appropriate vocabulary as it relates to the real number system in real-world situations (e.g., whole, natural/counting, rational, integers, etc.); use a scoring guide to perform self-evaluations.**	**Students will communicate in written or verbal form using appropriate vocabulary as it relates to the real number system in real-world situations (e.g., whole, natural/counting, rational, integers, irrational, etc.); use a scoring guide to perform self-evaluations.**
STUDENT LEARNING EXPECTATION __				

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THIS DOCUMENT ADDRESSES THE APPLICATION AND USE OF LEARNING PROPOSED BY THE ARKANSAS CURRICULUM FRAMEWORKS

STRAND: 2 GEOMETRY AND SPATIAL SENSE

CONTENT STANDARD __1_ **The student will demonstrate, construct, communicate, and apply the properties of geometric shapes and spatial sense to connect geometry with problem solving situations..**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _1_ **Identify, draw, classify, and compare geometric figures and their relationships in one, two, and three dimensions (from points to *polyhedra*) with physical materials.**	**Students will identify, draw, classify, and compare geometric figures and their relationships in one, two, and three dimensions (e.g., parallel lines, perpendicular lines, angles, basic polygons by number of sides, rectangular solid, etc.) with physical materials.**	**Students will identify, draw, classify, and compare geometric figures and their relationships in one, two, and three dimensions (e.g., parallel lines, angles, basic polygons by number of sides and angles, rectangular solid, pyramid, prisms with varying bases, etc.) with physical materials.**	**Students will identify, draw, classify, and compare geometric figures and their relationships in one, two, and three dimensions (e.g., angles, triangles by number of sides and angles, polygons by sides and angles including regular polygons, circles, cylinder, cone, etc.) with physical materials.**	**Students will identify, draw, classify, and compare geometric figures and their relationships in one, two, and three dimensions (e.g., solids with nets/paper patterns, cross sections of solids, etc.) with physical materials.**
STUDENT LEARNING EXPECTATION _2_ **Apply geometric properties and formulas (e.g., triangles have 180 degrees, opposite sides of rectangles are equal, Pythagorean theorem) to solve problems with and without appropriate technologies.**	**Students will apply geometric properties and formulas (e.g., triangles have 180 degrees, circles have 360 degrees, acute angle/triangle, right angle/triangle, obtuse angle/triangle, etc.) to solve problems with and without appropriate technologies.**	**Students will apply geometric properties and formulas (e.g., perimeter formula, area formula, circumference formula of a circle, characteristics of basic polygons, etc.) to solve problems with and without appropriate technologies.**	**Students will apply geometric properties and formulas (e.g., area of rectangle, triangle, trapezoid, characteristics of triangles, formula for the sum of the interior angles of a polygon, area of a circle, etc.) to solve problems with and without appropriate technologies.**	**Students will apply geometric properties and formulas (e.g., Pythagorean theorem, volume formulas for cylinders and prisms and pyramids, surface area formulas for cylinders and prisms and pyramids, etc.) to solve problems with and without appropriate technologies.**

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STRAND: 2 **GEOMETRY AND SPATIAL SENSE**

CONTENT STANDARD __1. **The student will demonstrate, construct, communicate, and apply the properties of geometric shapes and spatial sense to connect geometry with problem solving situations..**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _3_ **Make predictions based on transformations of geometric figures in problem-solving situations (e.g., compare 2 pictures and determine what changes were made, i.e. flip, slide, rotation).**	**Students will make predictions based on transformations (reflections, translations, and rotations) of geometric figures on the coordinate plane (negative and positive numbers) in problem-solving situations (e.g., mimicking a route at a different location, tessellations, etc.).**	**Students will make predictions based on transformations of geometric figures in problem-solving situations (e.g., comparing views of buildings, drawing geometric solids, etc.).**	**Students will make predictions based on transformations of geometric figures in problem-solving situations (e.g., develop a secret code using transformations of each letter of the alphabet such as rotating and reflecting each letter to serve as a symbol in the code, reflection and symmetry of objects, etc.).**	**Students will make predictions based on transformations of geometric figures in problem-solving situations (e.g., designing buildings, using a solid to make a net/paper pattern of the solid, etc.).**
STUDENT LEARNING EXPECTATION _4_ **Establish and apply geometric relationships through informal reasoning (e.g., estimate angle measures).**	**Students will establish and apply geometric relationships through informal reasoning (e.g., estimate angle measures).**	**Students will establish and apply geometric relationships through informal reasoning (e.g., estimate congruency, symmetry, area and perimeter) with and without physical materials.**	**Students will establish and apply geometric relationships through informal reasoning (e.g., estimate the sum of interior angles in a polygon).**	**Students will establish and apply geometric relationships through informal reasoning (e.g., estimate volume and surface area).**

STRAND: **2 GEOMETRY AND SPATIAL SENSE**

CONTENT STANDARD __1. **The student will demonstrate, construct, communicate, and apply the properties of geometric shapes and spatial sense to connect geometry with problem solving situations..**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _5_ **Visualize, model, and represent 3 dimensional objects (e.g., cube models, base plans/nets, building plans, isometric dot paper sketches) to develop and implement problem-solving strategies and verify solutions.**	**Students will visualize, model, and represent 3 dimensional objects (e.g., determining the perimeter of various cubic containers and solids with and without the same base and height) to develop and implement problem-solving strategies and verify solutions.**	**Students will visualize, model, and represent 3 dimensional objects (e.g., using isometric drawings to show 3 dimensional structures on paper and using orthogonal drawing to show three views (top, front, right) of related isometric drawings to develop and implement problem-solving strategies and verify solutions.**	**Students will visualize, model, and represent 3 dimensional objects (e.g., using a 2 dimensional drawing to develop a 3 dimensional model) to develop and implement problem-solving strategies and verify solutions.**	**Students will visualize, model, and represent 3 dimensional objects (e.g., using nets/paper patterns to determine the surface area and volume of 3 dimensional objects) to develop and implement problem-solving strategies and verify solutions.**
STUDENT LEARNING EXPECTATION __				

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STRAND: 2 GEOMETRY AND SPATIAL SENSE

CONTENT STANDARD _2_. The student will solve problems that connect geometric applications to other topics in mathematics and other fields.	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _1_ Construct geometric models to solve problems (e.g., comparing bridge supports: cylindrical vs. rectangular).	Students will construct geometric models to solve problems (e.g., determining linear measure such as perimeter of various size shipping boxes).	Students will use knowledge of polygonal and polyhedral properties to build a structure suited to a set of criteria or a to a situation.	Students will construct geometric models to solve problems (e.g., determining the largest floor plan and most cost efficient floor plan for a model home).	Students will construct geometric models to solve problems (e.g., comparing bridge supports, cylindrical vs. rectangular).
STUDENT LEARNING EXPECTATION _2_ Investigate geometric properties and use them to describe and explain situations in society and nature (e.g., why doors are rectangular, why honeycombs are hexagonal, why trusses are triangular).	Students will investigate geometric properties and use them to describe and explain tesselations in society and nature (e.g., wall paper patterns, floor tiles, honeycombs, etc.)	Students will describe the properties of triangles and quadrilaterals and explain why those shapes are suited to particular uses in structures and nature (e.g., shape of doors, trusses, tripods, spider webs, etc.).	Students will investigate geometric properties of polygons and use them to describe and explain situations in society and nature (e.g., Why was the Pentagon built as a five sided building? Why do bees build their comb hexagonally? Why are cylinders used as columns?).	Students will investigate geometric properties and use them to describe and explain situations in society and nature (e.g., the slope of stairways, access ramps, roof designs, roads, and ant hills).

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STRAND: 3 MEASUREMENT

CONTENT STANDARD __1. The student will use measurement attributes (length, capacity, weight, mass, area, volume, time, money, temperature, scale, and angle) to describe and compare mathematical and real-world objects.	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _1_ Use estimation to check the reasonableness of measurements obtained from use of various instruments (including angle measures).	Students will estimate before measuring (length to the nearest foot, inch, meter, and centimeter; time to the nearest minute; weight to the nearest pound; mass to the nearest kilogram; liquid capacity to the nearest liter/cubic decimeter and cup) with appropriate tools to check for reasonableness of measurement.	Students will estimate before measuring length, area, and angle measures to check the reasonableness of the measures obtained from using various measuring instruments (e.g., rulers, yard and/or meter sticks, protractors, etc.).	Students will estimate before calculating surface area and angle measures to check the reasonableness of the measures obtained from using various measuring instruments.	Students will estimate before determining the scale of a drawing to check for reasonableness of the measures obtaiaed from using various measuring instruments.
STUDENT LEARNING EXPECTATION _2_ Estimate, calculate and compare the one, two and three dimensional features of objects in metric, customary and non-standard units of measure.	Students will estimate, calculate and compare the perimeter of objects in metric, customary (U. S. Standard) and non-standard units of measure.	Students will calculate and compare areas of objects with the same perimeter. Students will calculate and compare perimeters of objects of the same area. Students will be able to obtain accurate measurements by estimating to the nearest half-inch, centimeter, quarter-inch, and millimeter for small objects.	Students will estimate, calculate and compare the area and surface area of two and three dimensional objects in metric and customary units of measure.	Students will estimate, calculate, and compare the volume of two and three dimensional objects in metric and customary units of measure.

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STRAND: **3 MEASUREMENT**

CONTENT STANDARD __1 **The student will use measurement attributes (length, capacity, weight, mass, area, volume, time, money, temperature, scale, and angle) to describe and compare mathematical and real-world objects.**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _3_ **Convert from one measurement to another within the same system (customary or metric).**	**Students will convert, through investigations, volume measurements(e.g., fluid ounces to cups to pints to quarts to gallons and milliliters to liters) and capacity measurements (e.g., cubic centimeters to cubic decimeters) within the same system; investigate the relationships between cubic decimeters to liters and cubic centimeters to milliliters using appropriate models.**	**Students will convert between millimeters, centimeters, decimeters, and meters and between inches, feet, and yards when needed in the context of the situation.**	**Students will convert capacity/volume measurements (e.g., liters to kiloliters, tablespoons to fluid ounces to cups), linear measurements (e.g., millimeters to centimeters to decimeters to meters to kilometers, inches to feet to yard to mile), and weight/mass measurements (e.g., grams to kilograms, pounds to tons) within the same system.**	**Students will convert from one measurement to another within the same system (metric and customary).**
STUDENT LEARNING EXPECTATION __				

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STRAND: 3 **MEASUREMENT**

CONTENT STANDARD ___2. **The student will demonstrate the appropriate use of measuring instruments.**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _1_ **Select appropriate units and tools (metric, customary and non-standard) to measure to the required degree of accuracy.**	**Students will choose the appropriate measuring tool (ruler, yard stick, meter stick, clock, weight scale, etc.) and unit (foot, inch, meter, centimeter, minute, pound, kilogram, liter, cup) to measure to the required degree of accuracy.**	**Students will choose the appropriate measuring tool (rulers, yard stick, meter stick, balance scale, clock, thermometer, weight scale, and protractor) and unit (metric, customary and non-standard) to make linear, area, and other specified measurements to the required degree of accuracy.**	**Students will choose the appropriate measuring tools and units (metric and customary) to measure capacity, length, weight, and mass to the required degree of accuracy.**	**Students will choose the appropriate measuring units and tools to measure to the required degree of accuracy.**
STUDENT LEARNING EXPECTATION __				

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STRAND: 3 MEASUREMENT

CONTENT STANDARD ___3 The student will apply measurement concepts to solve problems inside and outside the field of mathematics.	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _1_ Develop and use procedures to solve measurement problems using one, two, and three dimensions.	Students will develop and use strategies for finding the length of straight and curved lines and the perimeter of two and three dimensional objects.	Students will develop and use strategies to determine the area of regular and non-regular objects	Students will develop and use strategies to determine the surface area of three dimensional objects.	Students will develop and use strategies to determine the volume and capacity of three dimensional objects.
STUDENT LEARNING EXPECTATION _2_ Using manipulatives and technology, develop the concepts of rate of change (mph, interest, tax rates, commissions, utility rates) and indirect measurements (heights of an object, width of a river).	Students will use manipulatives and technology to develop the concept of rate (e.g., "per", cost per item, etc.) and of rate of change (e.g., rate of speed, etc.).	Students will use manipulatives and technology to develop the concepts of rate of change (sales tax rates, commissions, mph) and indirect measurements that can be determined by ratio and proportion.	Students will use manipulatives and technology to develop the concepts of rate of change (e.g., speed, unit prices, population rates, miles per gallon) and indirect measurements that can be determined by ratio and proportion.	Students will use manipulatives and technology to develop concepts of rate of change (e.g., equivalent rates, utility rates) and indirect measurments that can be determined by similar figures, scale drawings and the Pythagorean theorem.

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STRAND: 3 **MEASUREMENT**

CONTENT STANDARD ___3. **The student will apply measurement concepts to solve problems inside and outside the field of mathematics.**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _3_ **Construct scale drawings (using various tools) and/or build 3-D models to represent real-world problems and situations.**	**N/A**	**Students will construct scale drawings (e.g., drawing maps to scale).**	**Students will construct scale drawings (using various tools) and/or build 3-D models to represent real-world problems and situations (e.g., cost and square footage of a home).**	**Students will construct scale drawings (using various tools) and/or build 3-D models to represent real-world problems and situations (e.g., highway layout).**
STUDENT LEARNING EXPECTATION __				

THIS DOCUMENT ADDRESSES THE APPLICATION AND USE OF LEARNING PROPOSED BY THE ARKANSAS CURRICULUM FRAMEWORKS

STRAND: **4 DATA ANALYSIS, STATISTICS AND PROBABILITY**

CONTENT STANDARD __1. **The student will perform the steps that comprise data analysis, from gathering information to communicating results.**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _1_ **Actively and systematically collect, organize and describe data using technology when appropriate.**	**Students will collect categorical or numerical data and organize the data in a sensible way, using technology when appropriate.**	**Students will collect categorical or numerical data and organize the data so that it makes sense to others, using technology when appropriate.**	**Students will actively and systematically collect, organize and describe data using technology (e.g., graphing calculators with and without computer linkage, CBL, and computer software including spreadsheet) when appropriate.**	**Students will actively and systematically collect, organize and describe data using technology (e.g., graphing calculators with and without computer linkage, CBL, and computer software including spreadsheet) when appropriate.**
STUDENT LEARNING EXPECTATION _2_ **Construct, read and interpret tables, charts and graphs (including stem-and-leaf, histogram, bar graph, pie graph, box and whiskers, line graph, scatter plots) with and without technology.**	**Students will construct, read and interpret tables, charts, bar graphs, broken-line graph, and mystery graphs (various graph shapes).**	**Students will construct, read and interpret tables, charts, line graphs, stem-and-leaf plots, bar graphs, and pie graphs.**	**Students will construct, read and interpret tables, charts, box-and-whisker graphs, circle graphs, line graphs, stem-and-leaf plots, scatter plots, and histograms with and without appropriate technology (e.g., graphing calculators with and without computer linkage, CBL, etc.) and appropriate computer software (e.g., spreadsheets).**	**Students will construct, read and interpret tables, charts, double bar graphs, double line graphs, circle graphs, histograms, scatter plots, and stem-and-leaf plots with and without appropriate technology (e.g., graphing calculators with and without computer linkage, CBL, etc.) and appropriate computer software (e.g., spreadsheets).**

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STRAND: **4 DATA ANALYSIS, STATISTICS AND PROBABILITY**

CONTENT STANDARD __1. **The student will perform the steps that comprise data analysis, from gathering information to communicating results.**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _3_ **Based on analysis of central tendencies (mean, median, mode, range) make predictions and inferences (e.g., interpolate from within graphs and extrapolate by extending graphs) from the data set with and without technology.**	**Students will determine the maximum and minimum for a set of numerical data; compute the range for a set of numerical data; make predictions and inferences from a set of numerical and categorical data with and without technology.**	**Students will compute the mode, median, and mean for a set of numerical data and explain what those measures tell about the data.**	**Based on analysis of central tendencies (mean, median, mode, range) students will make predictions and inferences (e.g., line of best fit and reporting of appropriate central tendencies for certain situations) from the data set with and without appropriate technology (e.g., graphing calculators with and without computer linkage, CBL, and computer software including spreadsheets).**	**Based on analysis of central tendencies (mean, median, mode, range) students will make predictions and inferences (e.g., interpolate from within graphs and extrapolate by extending graphs) from the data set with and without appropriate technology (e.g., graphing calculators with and without computer linkage, CBL, and computer software including spreadsheets).**
STUDENT LEARNING EXPECTATION __				

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STRAND: 4 DATA ANALYSIS, STATISTICS AND PROBABILITY

CONTENT STANDARD ___2. **The student will use probability models to perform experiments and simulations.**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _1_ **Conduct experiments or simulations, with and without technology, to model situations and construct *sample spaces*.**	**Students will conduct experiments or simulations, with and without technology, to construct *sample spaces* (e.g., finding all possible outcomes for drawing a colored cube out of a bag).**	**Students will determine experimental probabilities using sampling activities, with and without technology.**	**Students will conduct experiments or simulations, with and without technology, to model situations (e.g., surveying a group for prediction purposes) and construct *sample spaces*.**	**Students will conduct experiments or simulations, with and without technology, to model situations and construct *sample spaces* (e.g., use a counting tree to determine all possible outcomes of a game or experiment).**
STUDENT LEARNING EXPECTATION _2_ **Make predictions based on experimental and theoretical probabilities.**	**Students will make predictions based on experimental probabilities (e.g., predicting what playing card will be turned up next).**	**Students will tell the likelihood of an event occurring based on experimental and theoretical probabilities.**	**Students will make predictions based on experimental and theoretical probabilities (e.g., designing spinners with certain probability).**	**Students will tell the likelihood of an event based on experimental and theoretical probabilities (e.g., determining the chances to win a prize in a sweepstakes).**

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STRAND: **4 DATA ANALYSIS, STATISTICS AND PROBABILITY**

CONTENT STANDARD __2_ **The student will use probability models to perform experiments and simulations.**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _3_ **Use a probability model for comparing experimental results with theoretical expectations.**	**Students will compare experimental results with theoretical expectations (e.g., theoretical expectation for the sum of two rolled dice to be odd or even compared to the experimental results).**	**Students will compare experimental results with theoretical expectations (e.g., theoretical expectation to flip heads on a dime is ½, but experimental result may vary).**	**Students will use a probability model (an activity that simulates the use of probability) for comparing experimental results with theoretical expectations (e.g., theoretical probability of landing on a certain outcome after spinning a spinner divided into 3 equal parts is 1/3, but the experimental results may vary).**	**Students will use a probability model (an activity that simulates the use of probability) for comparing experimental results with theoretical expectations (e.g., theoretical probability of drawing a winning number from a bowl of 20 different numbers is 1/20, but the experimental results may vary).**
STUDENT LEARNING EXPECTATION _4_ **Interpret experimental and theoretical probabilities to determine whether outcomes are equally likely or biased.**	**Students will interpret experimental results and theoretical expectations to determine which outcome is most likely to occur if the experiment was conducted again.**	**Students will determine whether games are "fair" or biased.**	**Students will interpret experimental and theoretical probabilities to determine whether outcomes are equally likely or biased.**	**Students will interpret experimental and theoretical probabilities to determine whether outcomes are equally likely or biased.**

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STRAND: **4 DATA ANALYSIS, STATISTICS AND PROBABILITY**

CONTENT STANDARD ___3. **The student will apply probability and statistical concepts in problem-solving and decision-making situations.**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _1_ **Evaluate arguments that are based on statistical data.**	**Students will determine the truth or validity of statements made by fellow students based on a set of data.**	**Students will determine the truth or validity of statements that claim to be based on a set of data.**	**Students will evaluate arguments that are based on statistical data (e.g., advertisements).**	**Students will evaluate arguments that are based on statistical data (e.g., effects of proposed legislative actions).**
STUDENT LEARNING EXPECTATION _2_ **Make inferences and convincing arguments based on statistics with and without technology.**	**Students will make valid statements based on a set of data.**	**Students will make decisions and influence the decisions of others based on a set of data.**	**Students will make inferences and convincing arguments based on statistics (e.g., develop own advertisements) with and without appropriate technology (e.g., graphing calculators with and without computer linkage, CBL, and computer software including spreadsheets).**	**Students will make inferences and convincing arguments based on statistics (e.g., effects of new or revised laws) with and without appropriate technology (e.g., graphing calculators with and without computer linkage, CBL, and computer software including spreadsheets).**

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STRAND: 4 **DATA ANALYSIS, STATISTICS AND PROBABILITY**

CONTENT STANDARD ___3. **The student will perform the steps that comprise data analysis, from gathering information to communicating results.**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _3_ **Model the use of probability and statistical methods in decision making using technology presentation materials (e.g., LCD, graphing calculators, spreadsheets, etc.).**	**Students will model the use of statistical methods in decision making (e.g., making valid decisions based upon experimental data) using appropriate technology for presenting their reasoning and results.**	**Students will use probability and statistical methods to collect and analyze data to make sound decisions (e.g., recording and analyzing the results of repeatedly flipping a coin); present results using appropriate technology.**	**Students will model the use of probability and statistical methods in decision making using technology presentation materials (e.g., graphing calculators, spreadsheets, etc.).**	**Students will model the use of probability and statistical methods in decision making using technology presentation materials (e.g., LCD, graphing calculators, spreadsheets, etc.).**
STUDENT LEARNING EXPECTATION __				

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STRAND: 5 **PATTERNS, ALGEBRA AND FUNCTION**

CONTENT STANDARD __1 **The student will use the language/symbols of algebra to represent patterns.**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _1_ **Represent arithmetic as algebra (change 25 = ___ + 13 to 25 = m + 13).**	**Students will represent arithmetic as algebra (change 25=__+13 to 25=m+13).**	**Students will use a variable to represent an unknown in problems involving simple arithmetic.**	**Students will represent the whole-number properties (e.g., identity, commutative, associative, etc.) in algebraic form.**	**Students will represent whole-number properties (e.g., distributive, multiplicative inverse, etc.) in algebraic form.**
STUDENT LEARNING EXPECTATION _2_ **Through the use of manipulatives and computer technology, develop the concepts of variables, expressions, and equations (algebra tiles, two color counters, graphing calculators, balance scale model, etc.).**	**Students will use manipulatives (e.g., balance scale model) and appropriate technology (handheld and computer) to develop the concept of variables.**	**Students will use manipulatives (e.g., algebra tiles, two color counters, balance scale model) and appropriate technology (handheld and computer) to develop linear expressions and equations.**	**Students will use manipulatives and computer technology (e.g., algebra tiles, two color counters, graphing calculators, balance scale model, etc.) to develop the concepts of variables, expressions, and equations.**	**Students will use manipulatives and computer technology (e.g., algebra tiles, two color counters, graphing calculators, balance scale model, etc.) to develop the concepts of equations.**

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STRAND: 5 **PATTERNS, ALGEBRA AND FUNCTION**

CONTENT STANDARD ___1. **The student will use the language/symbols of algebra to represent patterns.**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _3_ **Analyze and represent (through calculator use) situations and number patterns with tables, graphs, and equations (e.g., identifying linear, exponential, and quadratic patterns).**	**Students will analyze and represent, with and without calculator, number patterns with tables.**	**Students will analyze and represent, with and without a calculator, situations and number patterns with tables and graphs.**	**Students will analyze and represent (with and without calculator use) situations and number patterns with tables, graphs, and equations (e.g., identifying linear and exponential patterns).**	**Students will analyze and represent (with and without calculator use) situations and number patterns with tables, graphs, and equations (e.g., identifying linear, exponential, and quadratic patterns).**
STUDENT LEARNING EXPECTATION _4_ **Summarize and pose problems/situations relating to the algebraic relationships, patterns, and functions discovered through explorations.**	**Students will summarize and pose alternate problems/situations relating to patterns discovered through explorations.**	**Students will summarize and pose alternate problems/situations relating to algebraic relationships (e.g., linear equations) and patterns discovered through explorations.**	**Students will summarize and pose problems/situations relating to the algebraic relationships (e.g., linear equations), patterns, and functions discovered through explorations.**	**Students will summarize and pose problems/situations relating to the algebraic relationships (e.g., linear equations), patterns (e.g., exponential and quadratic), and functions discovered through explorations.**

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STRAND: **5 PATTERNS, ALGEBRA AND FUNCTION**

CONTENT STANDARD ___2 **The student will use algebraic concepts to model, to solve, and to test solutions of mathematical and real-world problems.**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _1_ **Conduct informal investigations (with technology) for analyzing, representing, interpreting, and generalizing functional relationships (e.g., distance and time) to develop explanations or predictions about outcomes of actual situations.**	**Students will conduct informal investigation (with or without technology) to identify unknowns/variables.**	**Students will conduct informal investigations (with or without appropriate technology) to identify unknowns/variables.**	**Students will conduct informal investigations (with appropriate handheld technology and/or computer) to develop explanations (e.g. describe the relationship between distance and time) or predictions about outcomes represented by collected data on a coordinate graph.**	**Students will conduct informal investigations (with appropriate technology) for analyzing, representing, interpreting, and generalizing functional relationships (e.g., distance and time) to develop explanations or predictions about outcomes of actual situations.**
STUDENT LEARNING EXPECTATION _2_ **Identify variables and relationships and translate them into mathematical statements or other mathematics representations to construct a model (e.g., converting from graphs, tables, words, and expressions).**	**Students will identify relationships in patterns and translate them into words or symbols to construct a model (e.g., converting from tables to words).**	**Given a problem or situations, students will construct a model (e.g., converting from graphs, tables, words and expressions) to generalize a pattern and communicate the rule.**	**Students will identify variables and relationships and translate them into mathematical statements or other mathematics representations to construct a model (e.g., converting from tables, words, and expressions).**	**Students will identify variables and relationships and translate them into mathematical statements or other mathematics representations to construct a model (e.g., converting from graphs, tables, words, and expressions).**

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STRAND: 5 **PATTERNS, ALGEBRA AND FUNCTION**

CONTENT STANDARD __2. **The student will use algebraic concepts to model, to solve, and to test solutions of mathematical and real-world problems.**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _3_ **Write and solve equations and inequalities (using manipulatives and technology).**	**N/A**	**Students will write and solve simple linear equations (using manipulatives and appropriate technology).**	**Students will write and solve linear equations and linear inequalities (using manipulatives and appropriate technology).**	**Students will write and solve equations (linear, quadratic, and exponential) and inequalities (using manipulatives and appropriate technology).**
STUDENT LEARNING EXPECTATION _4_ **Communicate in written and verbal form a verification of the solution and the process used to obtain the solution.**	**Students will communicate in written (e.g., journals, open-ended assessments, etc) and verbal forms the justification of the solution and the process used to obtain the solution (e.g., "How do you know your solution is the best choice?"); use a scoring guide to perform self-evaluations.**	**Students will communicate in written (e.g., journals, open-ended assessments, etc) and verbal forms the justification of the solution and the process used to obtain the solution (e.g., "How do you know your solution is the best choice?"); use a scoring guide to perform self-evaluations.**	**Students will communicate in written (e.g., journals, open-ended assessments, etc) and verbal forms the justification of the solution and the process used to obtain the solution (e.g., "How do you know your solution is the best choice?"); use a scoring guide to perform self-evaluations.**	**Students will communicate in written (e.g., journals, open-ended assessments, etc) and verbal forms the justification of the solution and the process used to obtain the solution (e.g., "How do you know your solution is the best choice?"); use a scoring guide to perform self-evaluations.**

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STRAND: 5 **PATTERNS, ALGEBRA AND FUNCTION**

CONTENT STANDARD ___2. **The student will use algebraic concepts to model, to solve, and to test solutions of mathematical and real-world problems.**	GRADE 5	GRADE 6	GRADE 7	GRADE 8
STUDENT LEARNING EXPECTATION _5_ **Use a calculator to display, to determine, and to make inferences from linear relationships in slope-intercept form.**	**N/A**	**Students will use manipulatives and/or appropriate handheld graphing calculators to develop the concept of slope.**	**Students will use manipulatives and/or handheld technology to make inferences from linear relationships in slope-intercept form concerning dependent and independent variables.**	**Students will use a calculator to display, to determine, and to make inferences from linear relationships in slope-intercept form (e.g., In the graph of the equation y= $24.50 x + $10.00, what does the y-intercept represent?).**

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